

RadioQuake: Getting back 'on air' after the Christchurch earthquakes

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Abstract

Local independent radio stations in Christchurch, New Zealand, had their operations severely disrupted by major earthquakes in September 2010 and February 2011. This article examines the experiences of three radio stations that were shut out of their central city premises by the cordon drawn around the city after the 22 February quake. One of the stations continued broadcasting automatically, while the others were unable to fully get back on air for several weeks afterwards. All of the stations had to manage access to workspaces, the emotional needs of staff and volunteers, the technical ability to broadcast, and the need to adapt content appropriately when back on air. For the locally based radio managers decisions had to be made about the future of the stations in a time of significant emotional, physical, and geological upheaval. The article explores how these radio stations were disrupted by the earthquake, and how they returned to air through new combinations and interconnections of people, workspace, technology, content and transmission.

Keywords

disaster

independent radio

New Zealand radio

Christchurch earthquake

Iwi (Maori) radio

local radio

The three radio stations addressed in this article were based in central Christchurch before the earthquake that destroyed much of the Central Business District (CBD) on 22 February 2011. All three were forced to leave their buildings and studios immediately after the earthquake, and returned to broadcasting in very different circumstances in the following weeks. The February earthquake was the biggest aftershock of a shallow 7.1 magnitude quake that occurred on 4 September 2010, which was centred in the countryside 40km west of the city. There were 4428 aftershocks before 22 February. The one that occurred at 12:51p.m. that day was smaller in magnitude than the original quake at 6.2, but it was centred in the hills along the suburban southern edge of the city, and in the particular geography of the region it created 'unusually violent ground movement' (Berryman 2012: 315). As a result there was widespread damage to land, homes and other buildings across the city, causing the death of 185 people and extensive emotional, social, economic and political upheaval (Hayward 2013; Torstonson and Whitaker 2011). In the immediate aftermath of the quake the whole central city area of Christchurch was cordoned off and secured by police and defence personnel (New Zealand Defence Force 2013). Residents and business owners, including the radio stations in this study, were kept out of the cordon area while buildings were demolished or 'made safe', and although the overall extent of this 'red zone' was reduced periodically (Canterbury Earthquake Recovery Authority [CERA] n.d.), it was not completely lifted until 30 June 2013.

The radio stations discussed here are all locally owned, and are operated on licences that require a commitment to specific kinds of communities. They are Plains FM, a community access station; Tahu FM, an iwi radio station that supports Māori language and the culture of the local iwi (tribe) Ngāi Tahu; and Pulzar FM, a local commercial station with a dance music format. Local radio in Christchurch is entirely provided by small-scale stations that

serve community rather than purely commercial ends. Plains FM has been broadcasting as a community access station from premises near the edge of the city centre since 1989. Plains FM is supported through airtime fees charged to its broadcasters, some additional donations and grants, and the community radio funding provided by the government broadcasting agency New Zealand on Air. In this Plains FM is connected to a network of twelve community access radio stations around the country. Tahu FM is owned by the South Island's largest iwi Ngāi Tahu, and was based in the iwi headquarters in the centre of the city until February 2011. Tahu FM began broadcasting in 1991, and is now one of 22 iwi radio stations in New Zealand. Tahu FM is also largely supported by funding from a government agency, Te Mangai Paho, the Maori Broadcasting Agency, with some advertising that is consistent with the station's kaupapa (vision). Pulzar is the most recently established of the stations, and operates as a local commercial station on a new form of licence introduced in 2008, so is reliant entirely on advertising for income but under license conditions that require particular forms of local service (Radio Spectrum Management n.d.). In comparison, the dominant radio stations in the city are the seventeen formatted stations operated by two foreign-owned national radio networks, Mediaworks and NZ Media and Entertainment. These are almost entirely broadcast from Auckland, with limited Christchurch localization in advertising and news and some breakout programming. Public service radio is provided by the Wellington-based state-owned Radio New Zealand (RNZ), which has a Christchurch newsroom.

As local radio stations, the subjects of this study were distinguished from the national networks by being completely embedded in the impacted communities after the February 2011 earthquake. While the national networks had staff, reporters and some hosts based in Christchurch their transmissions were not interrupted, and Auckland- and Wellington-based colleagues were able to maintain the flow of broadcasting and provide logistical support. In contrast, the burden of restoring and maintaining a constant broadcast from within the city

was carried only by the local stations' owners, managers and staff. All were silenced by the quake at some point, effectively disappearing from the airwaves.

Local radio stations located within a disaster-affected community serve more than an informational role, providing an important sense of community connection and support. This research examines the ecology of independent radio stations in Christchurch after the earthquake, with the understanding that radio stations are assembled from a complex and interrelated set of media systems and networks, including people, workspace, broadcast technology, content and a transmitter (Fuller 2005). When disaster disconnects the elements of a small independent radio station, their recombination requires a new kind of work in order to create content and perform that community role. After disaster the structural components of radio resonate through new permutational fields, which became fields of 'interference' in the effort to regain a broadcast flow. These include civil defence and emergency management regulations; the financial flows of other businesses and agencies; technical capacities; personal stress, trauma, uncertainty and loss; a radically reorganized real estate market; and the expectations of licensing authorities. On the other side of the broadcast, audiences and their listening needs are also transformed by disaster experiences. This research responds to the complex situations faced by independent radio stations in Christchurch after the 22 February 2011 earthquake, and asks how they were able to reassemble the elements of radio and the networks in which they are embedded. In order for there to be audiences and meaningful content, the managers and staff at local radio stations had to work through situations of extreme stress to get the radio back on air. This article argues that the elements of radio accumulate new meaning when pieced back together after a disaster, the implications of which may not be apparent for many years.

Radio, disaster and resilience

Radio's role in serving audiences during and after disasters is well documented in research (Kanayama 2012; Romo-Murphy et al. 2011; Nelson et al. 2010; Moody 2009, 2006; Sylvester 2008; Katayama 1992; Beady et al. 1986). A common theme is that radio is particularly efficient at carrying essential information across wide areas, despite challenging terrain and electricity problems (SEEDS Asia 2011; Nelson et al. 2010; Spence et al. 2009). In New Zealand, the role of radio stations in disasters is formalized as an informational one, in which the primary responsibility of radio stations is to carry accurate messages on behalf of the Ministry of Civil Defence & Emergency Management (MCDEM). This is governed by a Memorandum of Understanding (MOU) between the Ministry and the networked broadcasters. The MOU covers the protocols for broadcasting 'formal emergency announcements' (Ministry of Civil Defence & Emergency Management [MCDEM] et al. 2006: 3), on a national or regional basis. In addition, the public broadcast network Radio New Zealand National is designated a 'Lifeline Utility Broadcaster', and so obliged to remain functional through a disaster, and to demonstrate readiness and response preparedness for possible disasters. However, research into radio and disaster demonstrates a broader role than the informational: as a direct vehicle for community information-seeking and connecting (Panigrahi et al. 2008); supporting solidarity and restoring community (Hindman and Coyle 1999); and building community as talkback callers share and verify information on air (Ewart and Dekker 2013).

In both disaster impact and recovery, there is little emphasis in research on the effect of disaster on radio stations themselves, although it is difficult for radio to inform and connect communities when the local station is unable to function as a result of the disaster. Perez-Lugo's research into audience reliance on radio during the 'impact phase' of the twenty hours Hurricane Georges remained over the western end of Puerto Rico in 1998 acknowledges this in emphasizing radio's role in 'providing emotional support and a sense of community'

(2005: 210–11). One respondent in this study reported that when the radio was silenced after the local transmitter antenna blew down 'at that moment you start to feel helpless', and another recalls "'Well", I said to myself, "that's it, now the world is gone."' (2005: 220). Losing the radio severed the symbolic bridge between residents isolated in their homes by the violence and noise of the hurricane, and the imagined community of others going through the same experience, reinforcing the value of radio by its loss. Possibly the most extended analysis of a radio station coping with depleted resources and emotional stress after a disaster is Moody's work on the United Broadcasters of New Orleans, formed by two major networks displaced by the destruction of their premises by Hurricane Katrina (2006, 2009). These stations were extremely well resourced and supported by major national networks. In comparison, stations in Haiti and community radio in the Tōhoku and North Kanto regions of Japan faced much greater challenges to their post-quake survival, which remain relatively undocumented. There are news reports of radio stations having to physically rebuild in the wake of the Haiti earthquake of 2010, in which many of the nation's radio station buildings were destroyed. In the town of Jacmel, for example, station RTDJ101.5 lost its building with studio equipment inside, but staff scavenged enough from the rubble to put together a broadcast desk from a tent in the town square (Leeder 2010). Community radio stations in Japan were badly affected by the Tohoku earthquake and tsunami, which destroyed studio buildings, forcing stations to relocate into a variety of premises including cupboards in local council buildings (Kanayama 2012). Kanayama argues that the particular stresses of that event negatively affected radio stations already struggling for institutional support and resources (2012: 33).

Survival and recovery for individuals, communities and businesses in response to the earthquakes in Canterbury have been extensively framed as demonstrating 'resilience', by politicians, government agencies, media and tourism promoters (Key 2013; Statistics New

Zealand n.d.; Jasons Travel Media n.d.), although the reality of this is contested at more local levels, such as in opinion columns in the local newspaper (Anon. 2013; Eleven 2013; Yardley 2012). In December 2013, Christchurch's identification with 'resilience' was confirmed by inclusion in the first 33 cities of the Rockefeller Foundation's '100 Resilient Cities Centennial Challenge'. What resilience means in practice can range from simply continuing to live or run a business in the city, to 'returning' to a 'new normal' despite the stresses of aftershocks and the changing urban environment, to developing entirely new ways of living and working. This range of possibility maps onto a framing of resilience as simply the ability to absorb a shock and persist, to return to the previous level of functioning, or to adapt and transform (Britt et al. 2012: 2). Resilience, or its absence, in Christchurch, is identified against the long-term adversity of years of aftershocks, stress and uncertainty (Wilson 2013: 209), in what McColl and Burkle characterize as a period of "“pause” in the traditional disaster cycle', stuck between immediate disaster response and longer term recovery (2012: 39–40). A number of reports by local researchers explore resilience in the ability of communities and organizations to keep on going after the earthquake, but also to adapt positively to changing circumstances (Thornley et al. 2013; Britt et al. 2012; Stevenson et al. 2011a, Stevenson et al. 2011b).

Common threads through the broader resilience literature as well as in Christchurch-specific studies trace the importance of external support, networks, and connectedness in community and individual resilience (Thornley et al. 2013, Britt et al. 2012); the need to promote individual empowerment and efficacy (Britt et al. 2012: 30); and the role that broader environmental and social issues play in the resilience of businesses (Stevenson et al. 2011a). External support for communities includes funding from local and national government agencies and charities (Thornley et al. 2013), the broader social and cultural environment (Britt et al. 2012), or banks, insurance companies (Stevenson et al. 2011a) and

government support (Work and Income New Zealand n.d.). Resilience for communities, organizations and businesses, then, is a factor of the broader networks to which they are connected. The role of radio in these broader networks is referenced briefly in the Christchurch resilience literature. In interviews by Thornley et al., Volcano Radio is credited with keeping the Lyttelton community informed after the earthquake (2013: 75), while the post-quake silence from Plains FM is identified as having a negative effect on refugee and migrant Culturally and Linguistically Diverse (CALD) communities (2013: 135). The broader connections that shape resilience are part of the ecology of the radio stations.

Methodology

This research is part of a broader project exploring the role of radio after the Christchurch earthquakes, which examines all of the networked and independent stations in Christchurch, aiming to follow the stations over a number of years as they move to more permanent work spaces. It also retrospectively asks how people listened to and talked about radio in the post-quake periods, using sources such as Facebook and Twitter posts from the time and first-hand accounts of earthquake experiences preserved by the University of Canterbury's CEISMIC Canterbury Earthquake Digital Archive (2011-). The research in this article is grounded in interviews with the managers of local independent radio stations in Christchurch. The managers were responsible for guiding their organizations and staff through the earthquakes and aftermath, and they were responsible for resuming broadcasting after the 22 February quake, in a variety of circumstances.

Interviews were carried out over a period of eighteen months in 2012 and 2013. Interviewees were all contacted initially in December 2011, and the long process of finalizing the interviews reflects the upheaval that resonated through the city during the first two years of earthquakes. I was guided by the participants as to when they felt ready to talk about the

earthquakes and their impact. Nicki Reece, Manager of Plains FM, was interviewed in January 2012, less than a year after the February earthquake, in the premises that the station was able to return to in March 2011. Blade Jones, Manager of Tahu FM, was interviewed in September 2012, when the station was established in the most substantial of a series of post-quake spaces. Jason Akehurst, co-owner and Manager of Pulzar FM, was interviewed twice, once in September 2012 when the station was preparing to relaunch after being off air for nearly a year, and again in May 2013, when the station had been back on air for seven months and Akehurst was feeling more confident about its longer term survival.

Interviews were semi-structured, in order to map out a comparable sequence of events and processes across all stations but be responsive to the different experiences of the participants. All of the interviews began with a request to describe the original broadcast space of the station, and then to describe the effect on the station of the initial earthquake on 4 September 2010 and the subsequent period of aftershocks, and then the experience and effects of the 22 February 2011 earthquake. For each of the managers, the time after the 22 February earthquake involved very different kinds of decision-making and concerns, so the interviews became less structured while broadly covering similar issues around locating studios, recovering equipment, caring for staff, reaching audiences and responding to the post-earthquake period in broadcast content. By comparison with the February earthquake, the initial 4 September 2010 quake involved relatively little disruption. It is notable in the transcripts that managers found it difficult to remember the exact sequence of events after September, as the time 'in between' was completely overshadowed by February and its aftermath. The interview schedules were designed to avoid dwelling on the moment of the 22 February earthquake, as the research was about the broadcasting decisions made in the aftermath, and not intended to relive traumatic experiences. However, in practice all of the managers related their 'earthquake stories' in detail. It is also particularly apparent in reading

the transcripts much later that the desire to establish a shared connection between participants and researcher was present even into late 2012, in shared narratives of the earthquakes and aftermath, supportive affirmations and indications of understanding.

The following discussion recounts the experiences of each radio station manager immediately before, during and after the September 2010 and February 2011 earthquakes. They each had to find ways to get their radio stations back on air and keep them on air, while being embedded in a post-disaster community. Their experiences articulate the complex interrelationships between the people, broadcast technology, space, content and transmission of radio, and the structural networks that interfere with those. They demonstrate the importance of community support, institutional recognition and personal efficacy in enabling a radio station to be resilient enough to support broader community resilience.

Plains FM

Plains FM is the only radio station in Christchurch still broadcasting from its pre-quake studio. It is a community access station, owned by a trust board, and funded by a mix of New Zealand on Air grants, donations and the airtime fees paid by broadcast show hosts. Plains FM programming is created by community members, and by the time of the February earthquake the station hosted '68 programmes presented by community volunteers in 14 languages' (Reece 2010). The station was located just outside the inner city cordon after the first earthquake, but inside the cordon drawn after the February 2011 earthquake. Although the studio was technically fit for use, the cordon prohibited the station staff and broadcasters from accessing the building for five weeks.

As a community access station, Plains FM plays an important role in supporting CALD communities through community hosted radio shows. After the 4 September 2010 earthquake the first broadcasters back on air were the hosts of the Samoan radio show, Siufofoga O

Samoa, who began broadcasting as usual from 6:30 that morning – barely two hours after the quake. In that post-quake period, there was little disruption to the station's operation, and the programme makers were able to support their communities with key information in their own languages. Plains FM was able to fulfil its role as a community access broadcaster, providing space for multiple ethnic, interest and language communities in Christchurch to respond to the effects of the earthquake.

After the 22 February earthquake, the Plains FM staff evacuated with just a few personal belongings, and the broadcast system automatically switched over to the BBC World Service. The station's building itself never lost power and was quickly declared safe to enter, but the cordon drawn around the central city meant staff were unable to access the building for a month. Reece describes that in this time of being effectively off air she felt 'absolutely stuck. It was the most frustrating, awful period of my whole broadcasting career'. She spent some time trying to talk with Civil Defence and other groups about what Plains FM could do to help the emergency response. However

it was impossible to try and explain to people at the Civil Defence headquarters what we could do for them, our capacity [...]. People didn't really understand [...] who we were and what we were about [...]. Ours is a completely different model from commercial radio and even national radio [RNZ]. And I only had so much energy.

Reece felt that Civil Defence was only able to understand the role of the nationally networked radio stations in carrying the official emergency announcements covered by the MOU (MCDEM et al. 2006), and there was little scope to discuss the possibilities that Plains FM could offer for more localized and specialized broadcasting on behalf of Civil Defence.

Reece opened up her home as an office for the station staff, and from that base they focused on working out how to best fulfil the radio station's function once back on air. Remote broadcasting through the station's computer system was possible in theory, but far too slow in practice. For five weeks after the earthquake Plains FM simply relayed the BBC World Service, which provided a little coverage about the earthquake in that period, but the outside perspective on the city combined with other international stories had a rather distancing effect. Reece found that 'people who love [the World Service] were just in heaven, but for most of us it was, gosh where have we gone, we don't exist anymore'. In that period, the Plains FM staff focused on the station's role in the community, and Reece attended weekly interagency meetings for refugee and migrant support groups:

Even though we couldn't broadcast, we felt that our role was to find out what was happening with other people, so that when we did get back in we could sort of hit the ground running and be able to talk about what was happening with some knowledge in the community sector.

To start with that also meant simply rebuilding connections from scratch, because all of their contact details for other community organizations were inaccessible in the building. They did some recording, to piece together interviews and on air content, but were primarily focused on figuring out the basics of broadcasting in the new environment.

As an on air presence Plains FM only started to 'exist' again from 22 March, a full month after the earthquake, when the staff were given intermittent access to the building. They put together interviews and programmes they had recorded in the intervening weeks, 'So we sort of got our station back on air to a certain degree. Not the programmes themselves, but certainly the fact that we are Plains FM and it wasn't the BBC anymore'.

Finally on 1 April the part of the city in which the studio is located 'went green', full access was permitted, and regular broadcasting could resume. Plains FM lost a number of broadcasters as a result of the earthquakes, as people left the city or were unable to manage doing the radio show. Because the station's primary source of income is the fees paid by broadcasters to host programmes, the number of broadcasters has a direct financial impact on the station, so the salaried staff could only be maintained because of an Earthquake Wage Subsidy offered by government for the first six weeks after the quake.

New kinds of programmes were created in response to the earthquakes. The Quake Panel broadcast twice a week for five weeks, in which people involved in the rescue, civil defence and the processes of maintaining the city were brought together to talk about their experiences and what was happening in the city at the time. However, the most important informational function was gathering and passing on health and civil defence information to the different language groups catered to by the station. Since getting the station back to 'normal', Reece has been working on resource material for communicating with CALD communities, and developing the Community Language Information Network Group, to establish systems for better communicating with people who cannot communicate in English, and so become very isolated in a natural disaster.

Tahu FM

Tahu FM serves a specific community: members of the Ngāi Tahu iwi around Te Wai Pounamu, the South Island. Its role is to support the language and culture of Ngāi Tahu, and the station plays an important role in the overall community infrastructure of the iwi. In September 2010 the station was located in the Te Rūnanga o Ngāi Tahu (the Ngāi Tahu tribal council) headquarters in central Christchurch. After the 22 February 2011 earthquake the station and Te Rūnanga moved to a residential subdivision in the west of the city. In

describing the changes in the station after the earthquakes, station manager Blade Jones identifies broader networks of connectedness – the relationships with Te Rūnanga, the Iwi Radio Network, and the software and communications suppliers that helped them get back on air.

The September 2010 earthquake disrupted the station briefly, but the period after the earthquake was treated as a time to recover and look after each other rather than to restore the live broadcast system and the business as soon as possible. Tahu FM operated remotely, adding new content to the computer-run playlist from a makeshift studio in a staff member's house a few times a day. In the shock of that initial post-quake period, the priority for station management and staff was simply to look after the well-being of staff members and their whānau (family), and Jones felt that

when you're responsible for a team of people [...] their safety is paramount, even though you might really personally want to get the radio up and going. I was more concerned that they felt all right, and we had a couple of people that had just so freaked out that I'd rather that they just had a break than come back to work.

When the 22 February earthquake happened in the middle of a weekday, the experience of the September earthquake was useful, but the scale of the event was so much greater that everything had to be reconsidered.

Because of the station's connectedness in a network of iwi radio stations, and being a business owned by Te Rūnanga o Ngāi Tahu, they had external support to make temporary broadcast arrangements and plan new studio space. Tahu FM staff were evacuated along with the rest of the building, and the station remained on air using its automatic broadcast system and UPS power until the batteries ran down and silenced the station. Within a few days Tahu

FM staff were able to plug a Sky Television decoder into the transmitter and pick up the broadcast feed of Wellington iwi station Te Ūpoko o te Ika for retransmission, so that the Tahu FM signal was quickly able to carry live radio appropriately serving its audience. Although the broadcast came from Wellington, Tahu FM staff were able to use it to communicate with their own audiences, as Jones describes:

the comms team from Te Rūnanga and myself and anyone could just contact them and get any important messages out, you know, like go here, do this, this is here, you can get help from these people. So [...] they were fantastic, they were dedicating most of their daytime [to us].

Retransmitting the dedicated Te Ūpoko programming meant that responsibility to broadcast, and to provide appropriate information and connection for the audience was taken care of, so the Tahu FM staff were able to focus on more immediate post-quake issues:

it gave us this huge breathing room 'cos we were back on air doing what we needed to do but [...], I didn't have to bother our crew. 'Cos some of them had disappeared off to other places and were doing other things, other earthquake things.

Rebuilding a broadcast studio was facilitated by Te Rūnanga. Ngāi Tahu Properties established Portacom offices in a central carparking area of the subdivision, to house all of their staff, and the Tahu FM studio was re-established first in a 'tiny little room', then in a whole Portacom, and then a permanent house just before Christmas 2011. Once the first studio was ready on 7 March, Tahu FM broadcast live between 9a.m. and 5p.m., and used the Sky decoder to switch the signal to Radio Ngāti Porou, from the North Island's East Coast,

overnight. Like Te Ūpoko, Radio Ngāti Porou addressed programming specifically to the Tahu FM audience, and they were also able to support a large audience of Christchurch-based Ngāti Porou iwi members, further strengthening the station's connectedness.

Broadcast support from Iwi Radio Network stations in the North Island reinforced the strength of the network, and the role of Tahu FM within Te Rūnanga o Ngāi Tahu. Within the network, Jones feels that the stations became stronger and more closely connected through the post-quake period, and the Tahu FM staff in particular felt more connected to the other stations. The Iwi Radio Network is connected by the overall purpose of the stations to promote and support Maori language and culture, by their relationship with Te Māngai Pāho, the funding agency that supports them, and by technical facilities such as Punga Net, an online programme exchange system. However, the strength of the model is that each station is owned by their iwi, and is ultimately obliged to serve the interests and needs of that iwi, in their support of te reo and kaupapa Māori, Māori language and culture. After the earthquake that meant that the staff of Tahu FM were actively working to support the people, driving around the 'rucky old roads' of Christchurch delivering donations and food. That created a direct connection with their audience, which was continued on air with 'service messages between music, like you can get your chemical toilet here or if you need food or if you want to relocate and you need some petrol vouchers, all those sort of things, practical things'. Jones observes that the radio station, this 'amazing vehicle that can talk to all these people', was suddenly more valued by the Rūnanga. For several months afterwards the Ngāi Tahu Kaiwhakahaere (chair), Mark Solomon, came on the station in the mornings to keep people updated with what was happening on a bigger scale.

Tahu FM has changed some of its programming approach in response to the challenges of the earthquakes. Most significantly, the station began broadcasting in a combination of te reo (the Maori language) and English throughout the programming day, rather than

concentrating the content in specific time periods. This, as well as a shift in music away from a focus on hip hop and 'urban' music to a broader variety of styles, reflects the connection with broader audiences within the iwi, who turned to Tahu FM after the earthquakes. A new sense of the local has also led to greater discussion of Christchurch and South Island issues on air, and more attention being paid to different communities around the island.

Pulzar FM

Unlike Plains FM and Tahu FM, the dance music station Pulzar FM operates under a commercial licence, although one with a requirement to reflect and support the broader local community. The station is not eligible for government funding, and is owned by private individuals with no support from a larger body or associated radio stations. Before the September 2010 earthquake, Pulzar was in a precarious financial position, and the station barely survived the February quake; Pulzar went off air in December 2011, and relaunched in October 2012. The station has survived, so far, through the determination and work of its owners Jason Akehurst and Andy Poulson.

Pulzar's post-quake difficulties are traced by Akehurst to the particular nature of its 'local commercial' broadcast licence. When the station began in 1999 it operated as a Low Power FM Broadcaster under a General Radio User Licence (GURL). Over eight years Pulzar gained a significant following and advertiser base and was able to be relatively self sufficient, but by the end of 2007 the owners felt it had reached its limit and closed the station down. Then, in April 2008 the Government announced new local commercial FM Broadcasting licences, which offered the first opportunity in nineteen years to purchase a frequency in Christchurch, and seemed an appropriate vehicle for Pulzar FM to become more permanently established. The licences carried conditions intended to 'reflect and develop

regional and local character and identity' (Radio Spectrum Management n.d.), in response to the centralized network structure of New Zealand commercial radio. Licensees were required to be independent of other broadcasting interests, provide coverage of local news, and 'broadcast identifiably "local" content from the studio to the coverage area during peak hours' (Ministry for Culture and Heritage 2012). The licences were sold at auction, and Akehurst and Poulson ended up paying \$35,000 over budget for the particular licence they wanted. Further costs were attached to the frequency itself, which was engineered specifically for the city's main transmitter site Sugarloaf, and carried significant ongoing charges by the site's owner, Kordia. As Akehurst observes, compared with the LPFM operation, under the new licence

there's a lot more expense for your radio station starting up, you can't just turn on a transmitter and then build it as things go along, you have to have money in the bank to pay people's salaries so pretty much from day one you have to be making some level of income.

Even so, the business plan projected that with increasing monthly advertising sales, Pulzar FM would break even eighteen months from the relaunch date in April 2009.

Because of their commercial position, Pulzar FM was more affected by the September earthquake than Plains or Tahu FM. By 4 September 2010, the station had a strong advertiser base in the central city bars and venues. After the earthquake, Akehurst says, 'we went from a month that would have been within \$1,000 of our [...] break-even point, [...] to [just] \$1,000. Overnight. Pretty much every booking that we had for the month of September, [was] cancelled'. As the central city and people's confidence in going out again recovered, a revised plan projected the station would finally break even the following February. However

in the aftermath of the 22 February earthquake, 'when pretty much all of those venues ceased to trade in one day', none of the businesses that Pulzar relied on were able to operate, in some cases for years, if at all.

Pulzar was the only local radio station that managed to remain broadcasting in the immediate months after the earthquake, with only two brief periods of downtime while shifting studios. At the moment of the quake, Pulzar was one of two stations in the city on which a DJ was in the middle of a voicebreak (the other was Volcano Radio in Lyttelton). That DJ stayed on air for the 40 minutes it took Akehurst and Poulson to get back to the office from a local cafe. He spent the time talking and playing music, 'falling apart at the seams, but professional', in Akehurst's words, as the rest of the building was evacuated. In the aftermath they assumed they would be able to return to the station in a few days, so just switched the computer on to its automatic programme to keep the content flowing. Instead, by the end of that day the building was closed off along with the whole central city, and the automatic programme continued broadcasting until the power was finally cut to the building the following Sunday. Pulzar was back on air within a couple of hours, running a backup playlist from a computer at their broadcast engineer's home. Until May 2011 Pulzar operated from Poulson's home, where the DJs would record their shows and voicebreaks, then remotely 'upload them to the computer at the broadcast engineer's house, which would then play them out to on air'. With this system, Pulzar broadcast semi-live through the period in which Plains FM was off air, and Tahu FM was rebroadcasting other iwi stations. They carried on as normally as possible, adding any relevant earthquake and civil defence information they could find in hourly updates put together from websites and public information.

In May 2011 the station moved into space subleased from another business in the west of the city, until the transmission cost inherent in their licence finally became unsustainable against the inability to recover advertising income:

in the end [it was] the reality of never being able to really make more than very minor sales across that entire period, until we went off air, [...] we started making a little bit of traction in late September, but even then it was not going up anywhere near as quickly as it needed to and we were battling insurance companies to get pay out so that we could continue and in the end, there just wasn't the money there and so Kordia [the transmission hosts] turned around and said, well, if you can't pay us, we're not broadcasting you, goodnight.

Kordia switched off Pulzar's transmission on 7 December 2011. The station was heavily in debt and unable to access the equipment still trapped in their original studio in the city. Although the building was still standing, its owners had disappeared, so no one was able to give permission to go in and retrieve the contents. An advance from the insurance company made a temporary studio possible, but did not cover the value of what remained in the building.

Despite the debt and losses, Poulson and Akehurst relaunched the station, again, on 19 October 2012, from Akehurst's home. They returned to air just within the time limit established in the licence conditions before forfeiting the frequency, but from a different transmitter site, the Kordia bill still unpaid. In October 2013, Pulzar FM celebrated its first 'returniversary', and they moved into a new studio at the end of that year.

Discussion

The key point arising from studies of radio in disaster is that radio's role is broader than its informational content. Listeners' implicit relationships with presenters and other audience members contribute to a sense of community connection that is valuable and particularly valued in the stresses of disaster. Against this understanding, however, is the question of how local radio stations can provide this informational and community-building support when they are silenced by the same disaster. This research has provided an account of three Christchurch radio stations' different paths to getting back 'on air' after the earthquake of 22 February 2011. Their narratives demonstrate the commitment of local radio to serving their communities in the aftermath, and how challenging that is in the absence of official recognition and support. Each of the radio stations has been significantly changed by their post-quake experiences, in their ability to use the actual components of their broadcast systems, but also in the broader meanings and resonances of those components.

Breaking radio down into a constituent list of elements and interferences makes apparent the different forms that the radio stations took in the immediate aftermath of, and longer term recovery from, the earthquake of 22 February 2011.

People

All of the stations maintained fairly stable staffing on and off air, with most changes happening as on air volunteers at Plains and Pulzar moved away from Christchurch. However, all of the staff members, like everyone else in the city, were affected by stress, trauma, uncertainty and loss, and while the effects of those emotional states on making radio cannot be straightforwardly catalogued, the people who create the radio content have themselves, unavoidably, been changed by the disaster.

Workspace

The location and nature of post-quake work was different for all of the stations. Plains FM was back in its original studio space within two months, but renovations that had begun in January 2011 meant even that was a very new space. In the time before returning to the building, Nicki Reece's home was a space for work, as were community group meetings and other gathering places. Tahu FM's workspace has completely changed from a multi-level inner city building, to a brick and tile home in a suburban subdivision, passing through different kinds of temporary spaces in between. These were organized by the broader iwi organization, and have become symbolic of the radical reorganization of the property market – being situated in an iwi-owned subdivision that has benefited from post-quake residential relocations. Pulzar FM has similarly been through many workspaces, but has suffered from the changes in real estate value – having to sublease a small temporary space before going off air, running the studio from Jason Akehurst's home on relaunching, and eventually being able to move into a new office space. In the broader patterns of interference, Pulzar FM suffered the most, being so vulnerable to the financial flows of other businesses, and tied to the most complex licensing conditions.

Broadcast Technology

Without usable remote programming capability, Plains FM effectively disappeared into the BBC World Service in the first weeks, while Tahu FM used the satellite networking capacity of their iwi radio colleagues to broadcast in a more relevant form. Pulzar was the most networked and able to simply continue broadcasting despite the loss of studio.

Content

All of the stations' content has changed in response to the earthquake. While Plains and Tahu were transmitting as other stations, Pulzar was attempting to integrate emergency information

into its broadcast, compiled from websites and other sources. All three radio stations reported increased attention to the local over a longer term, and inevitably much content will be inflected by the broader ramifications of recovery and 'rebuild' in the city for a long time to come.

Transmission

This element of broadcasting was most transformed for Pulzar FM, when the transmission company switched off their signal at the end of 2011 and they relaunched through a different transmission site in 2012. Tahu FM maintained its signal by routing around their own studio entirely, connecting a different signal directly to the transmitter.

Three main findings can be generalized from these radio stations' experiences: the need for reliable networked broadcasting capability; the need to develop close relationships with local Civil Defence and Emergency Management organizations; and the value of connections and networks with community organizations, other businesses and radio stations. These elements all reflect the core components of resilience evident in other post-quake research in Christchurch, which may be summarized as community support, institutional recognition and personal efficacy (Britt et al. 2012: 27–30). The dominant stories of the radio stations also relate closely to their licensed purpose and audience. For Plains FM this was the struggle to get back on air and particularly to serve Christchurch's CALD communities. For Tahu FM it was a focus on staff well-being and responding to the station's off-time by giving staff space to deal with their own situations and assist the broader iwi, in keeping with the kaupapa of iwi radio. Pulzar FM was driven by sheer commercial survival. These experiences are grounded in the particular nature of the long-running earthquakes in Christchurch. However, they demonstrate the challenges faced by any small radio station after disaster, when the people who run the radio station are as affected by disaster as the audience they serve.

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